

# Surface Navy Association 2012

## Weapons Safety

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# Weapons Safety

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- Origins of Explosive Safety
- Weapons System and Explosive Safety Review Board (WSESRB)
- Insensitive Munitions



# Origins of Explosive Safety

# Port Chicago Incident

- Naval Magazine Port Chicago Pier – July 17, 1944





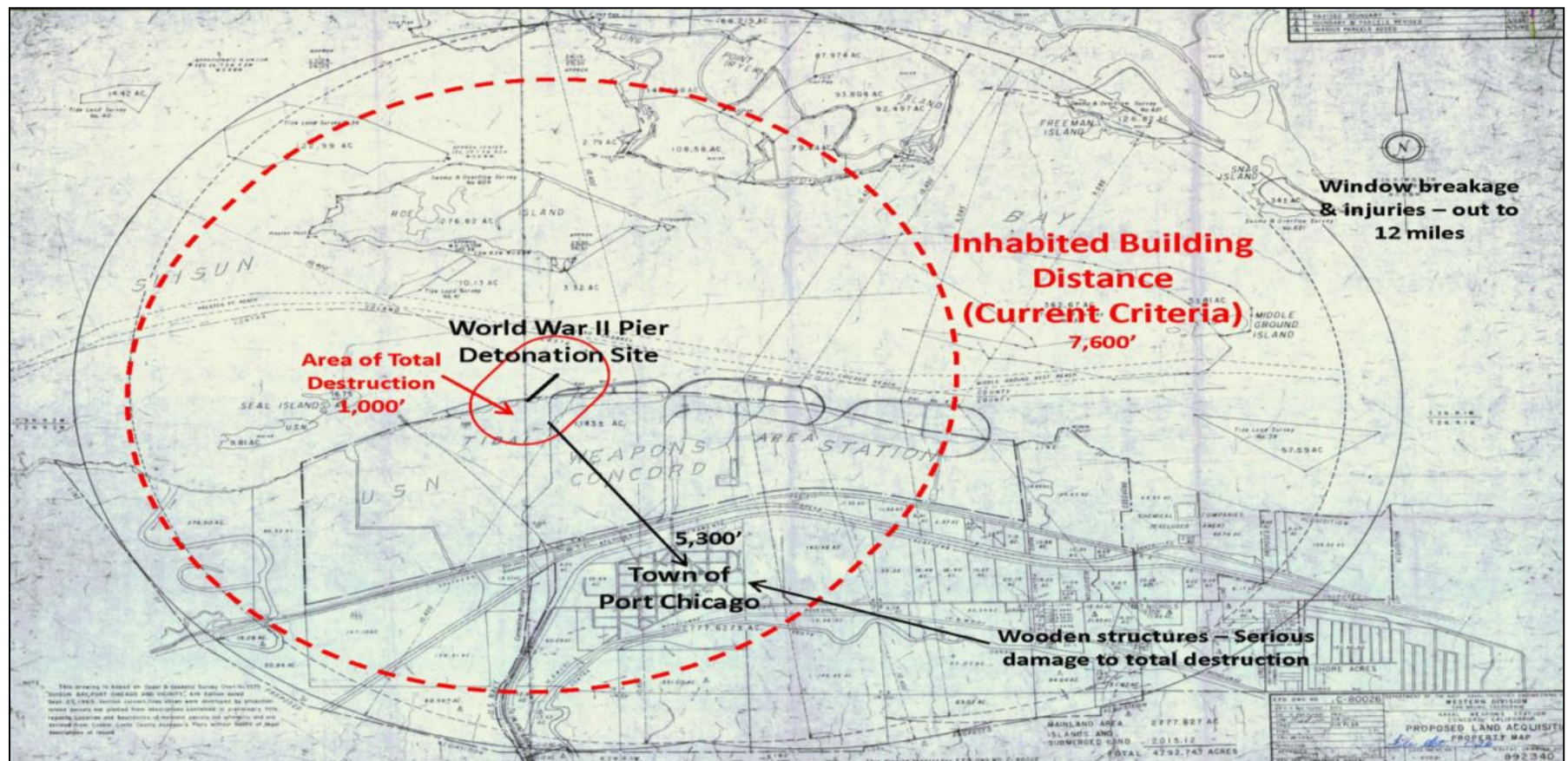
# Port Chicago Incident

- Town of Port Chicago Railway Station – July 17, 1944



# Port Chicago Incident

- Map of Port Chicago – depicting damage and range





# Origin of Explosives Safety Criteria

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- Lake Denmark NJ – Explosion 1926
  - Initial detonation caused adjacent potential explosion sites (PESs) to detonate
  - Result – Loss of entire Explosive Complex
- Actions of Congress
  - Established Council of Colonels – 1928 [today's Department of Defense Explosives Safety Board (DDESB)]
  - Developed Tables of Standards [Explosives Safety Quantity Distance (ESQD)]





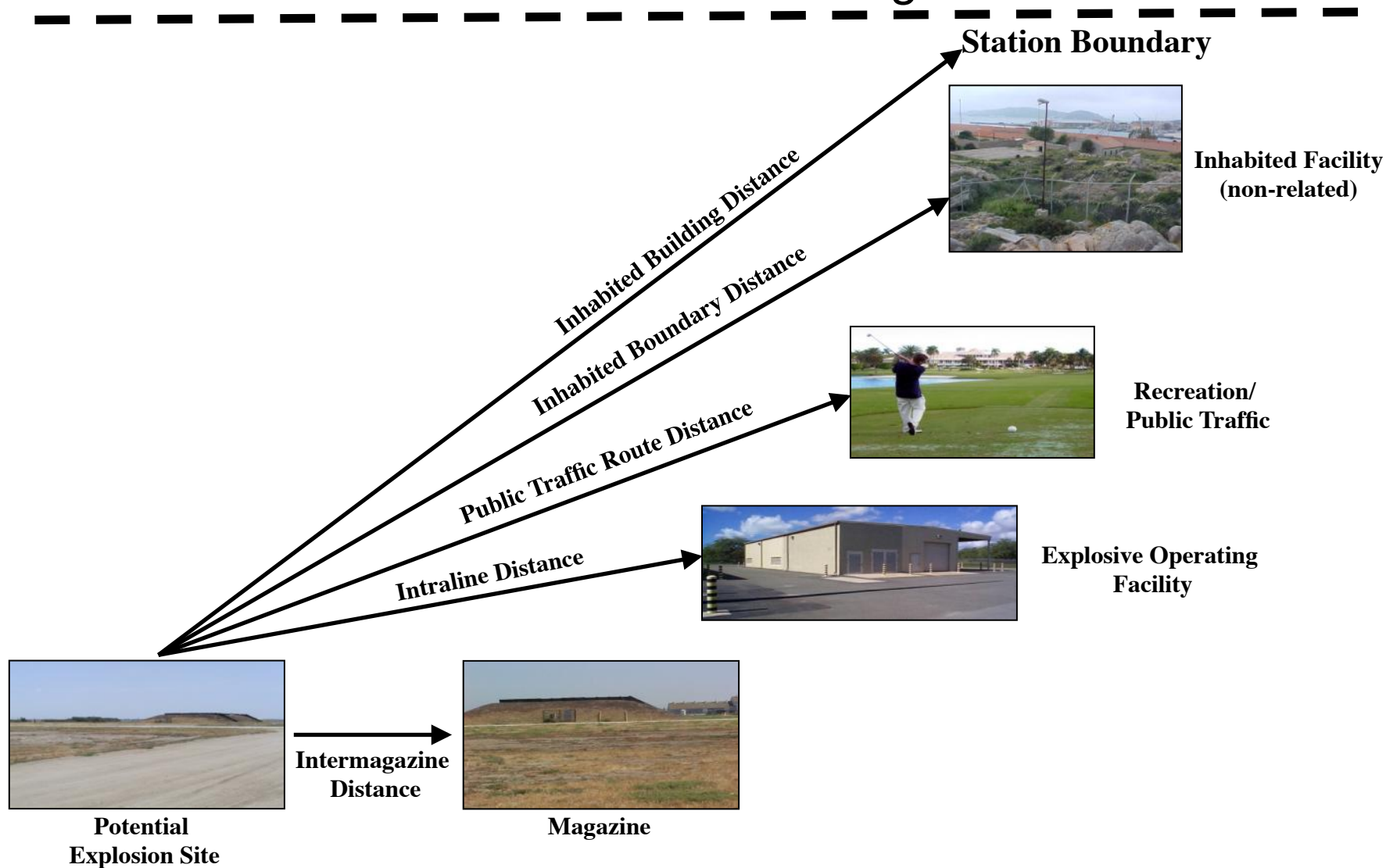
# Explosives Safety Criteria Control Procedures

- DDESB Criteria – “Probability-of-One” – Any explosive material being stored or handled could detonate
- Risk – Blast overpressure and fragments
- Explosives Safety Quantity Distance (ESQD) arcs establish zones of permissible exposure:
  - Inhabited Building Distance (IBD): Separation from structures with non-related personnel
  - Public Traffic Route Distance (PTRD): Separations from public roadway and open recreation facilities
  - Intraline Distance (ILD): Separation from ordnance operating facilities (related)
  - Intermagazine Distance (IMD): Separation from ammunition storage magazines to prevent detonation (domino effect)
- Site Approval Process: Required for all ammunition facilities and other facilities located within ESQD arcs



# Explosives Safety Criteria

- ESQD Arcs – Control Potential Damage





# **Weapons System & Explosive Safety Review Board**



# Weapons System & Explosive Safety Review Board: Why?

- Established in 1968 as a result of mishaps aboard aircraft carriers
- Provides independent oversight of weapon program safety efforts to ensure maximum compliance with long standing weapon safety requirements

## Aircraft Carrier Incidents

*USS Forrestal*  
(1967)



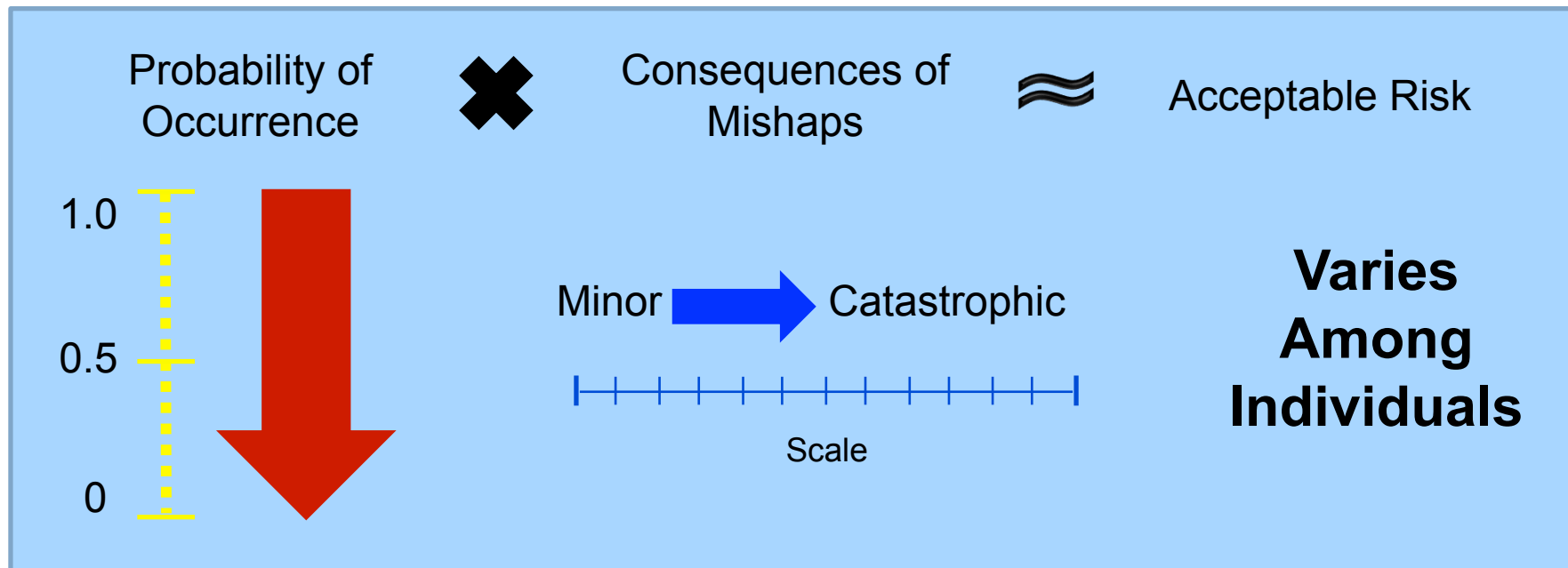
*USS Nimitz*  
(1981)



*USS Enterprise*  
(1969)



# Risk Management



**Goal: Mishap prevention through proper up-front design.**



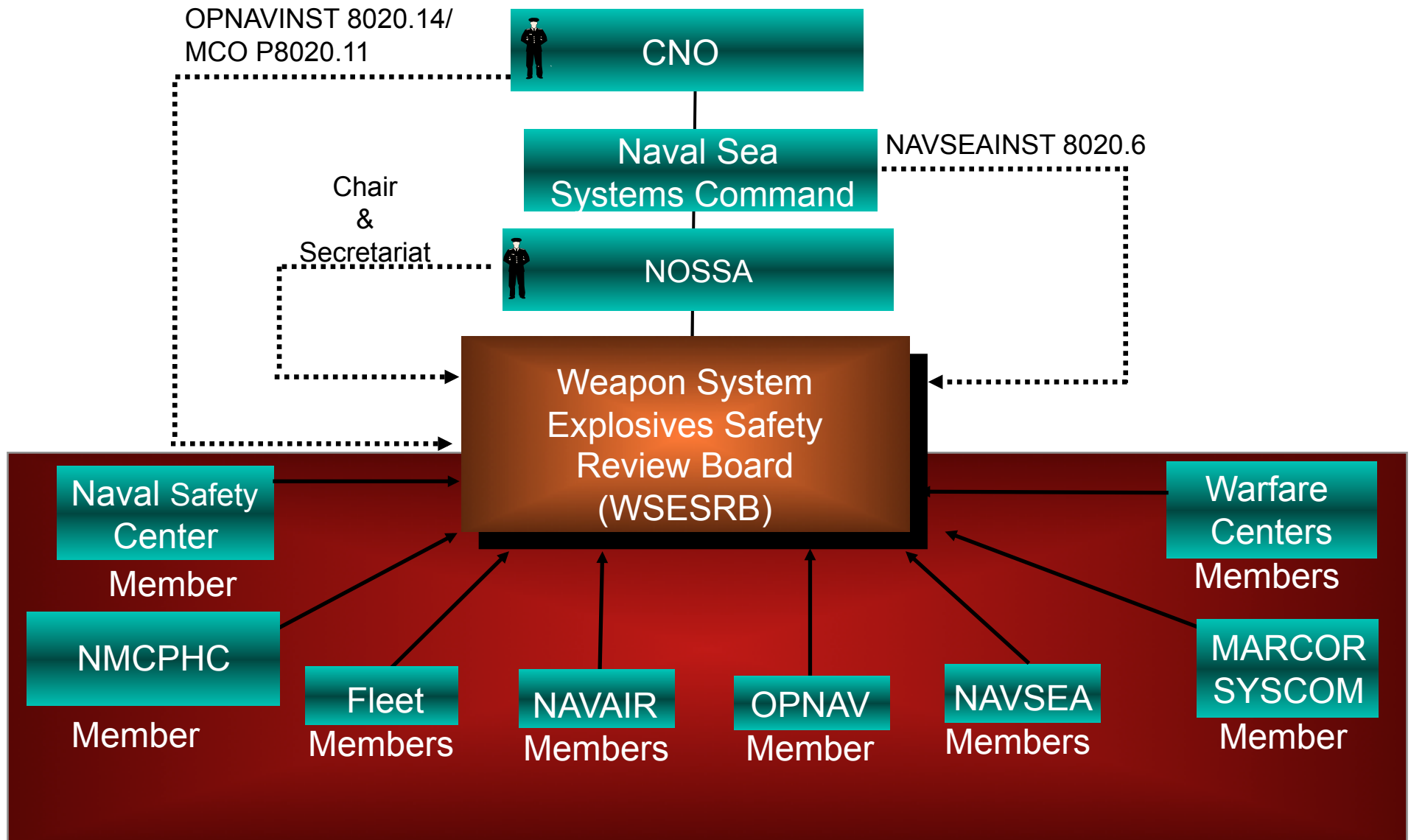


## What Does the WSESRB Do?

- The PEO/PM has life-cycle responsibility for acquisition programs and must identify, evaluate, and manage safety and health hazards/risks
- WSESRB reviews acquisition programs, including product improvement programs, for compliance with US/DoN safety design requirements and provides concurrence or non-concurrence
- PEO/PM Responds to the Board with the actions taken or planned
- For those hazards that cannot be eliminated, risk is assessed in accordance with MIL-STD-882 and DODI 5000.02; WSESRB provides concurrence
- PEO/PM must get any residual risk accepted at appropriate level
  - High Risk = ASN (RDA)
  - Serious Risk = PEO
  - Moderate/Low Risk = PM



# WSERSB Composition

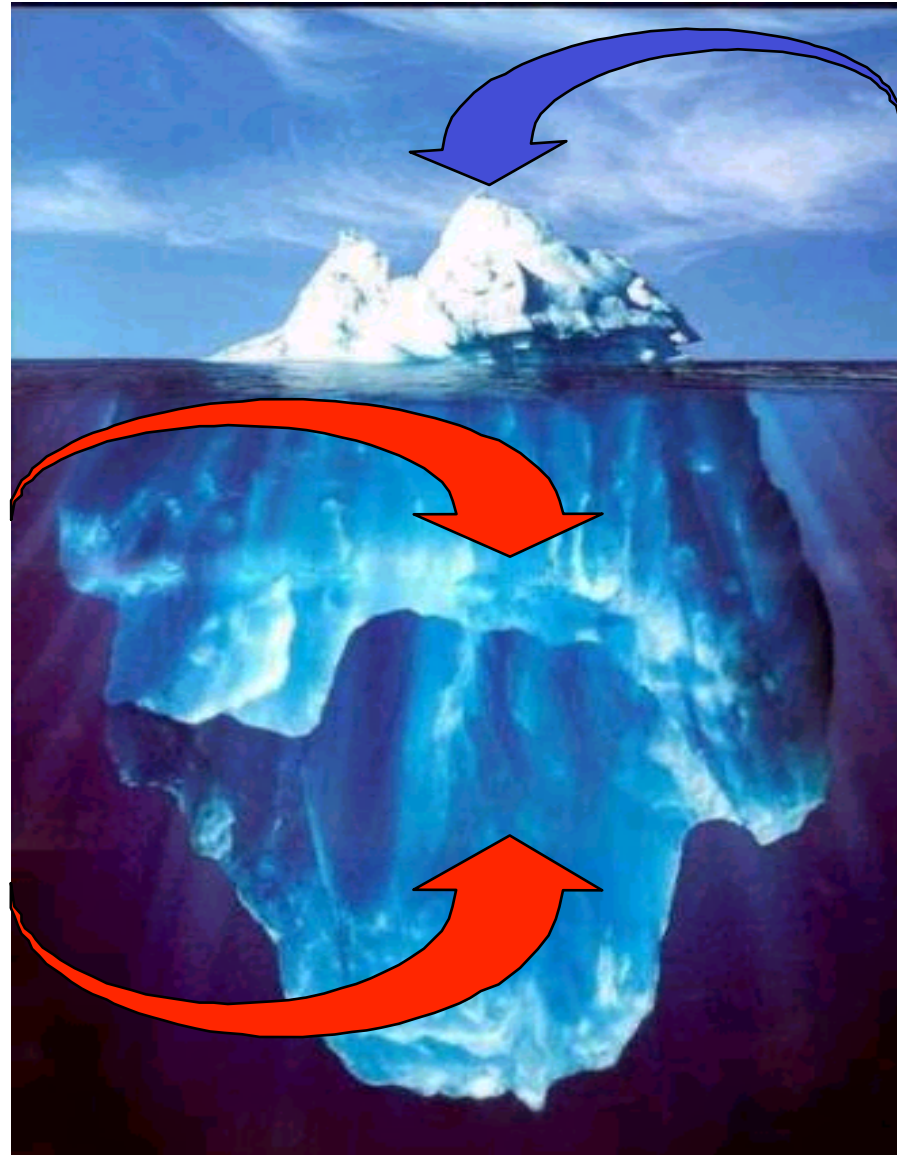




# WSESRB Visibility: The Whole Iceberg

Extensive efforts to  
develop safe weapons  
systems and ordnance  
items

Weapons System Safety  
and the WSESRB  
Process



Users/Operators/  
Ordnance Officers are  
most familiar with safe  
handling, storage  
procedures and  
processes of existing  
ordnance items  
(OP-4, OP-5,  
NATOPS)



# INSENSITIVE MUNITIONS





# Insensitive Munitions (IM) Defined

## IM is ...

- A Navy-original initiative to increase ship survivability
- Acquisition-driven to integrate energetic materials and munitions design technologies that reduce weapons' reaction to violence and collateral damage to heat, shock and impact stimuli while maintaining performance

## IM is not ...

- a wholesale legacy weapons inventory modernization/recapitalization requirement



**IM is important to the Fleet and Joint warfighter to protect platforms and personnel from reactions of our own weapons – whether through accident, combat or terrorist activities**



# IM Compliance Requires

## Passing standardized test series

- Thermal
  - Fast cook-off, Slow cook-off
- Impact
  - Bullet, Fragment, Shaped charge jet
- Shock
  - Sympathetic detonation
- Required per MIL-STD 2105D

## Systems approach for comprehensive solution

- Less sensitive energetic materials
  - Explosives, Propellants
- Novel materials
  - Rocket motor cases; Warhead materials, and Packaging





**QUESTIONS ?**



**BACK-UP**





# Navy IM Roles & Responsibilities

## OPNAV

### ***IM Policy Development & Implementation***

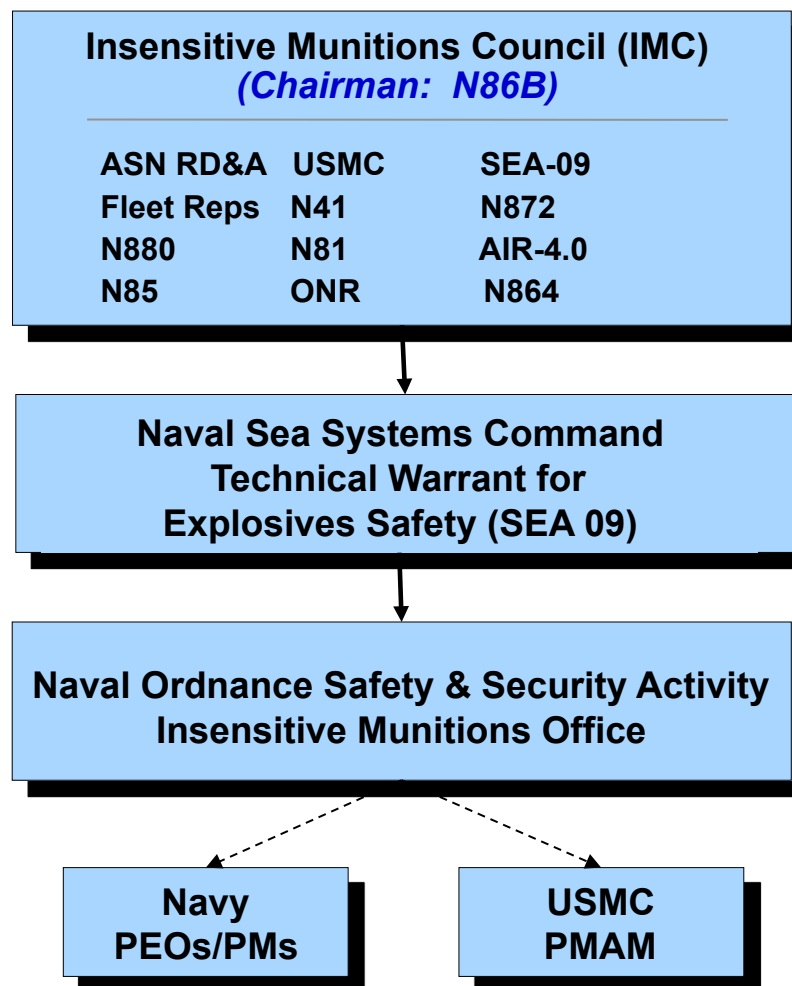
Duties of the IMC shall include:

- CNO endorsement of DON IMSPs
- Coordination of the planning funding and execution of the IM program (***OPNAVINST 8010.13D***).

## NAVSEA/NOSSA

### ***Technical Direction & Navy IM Program Execution***

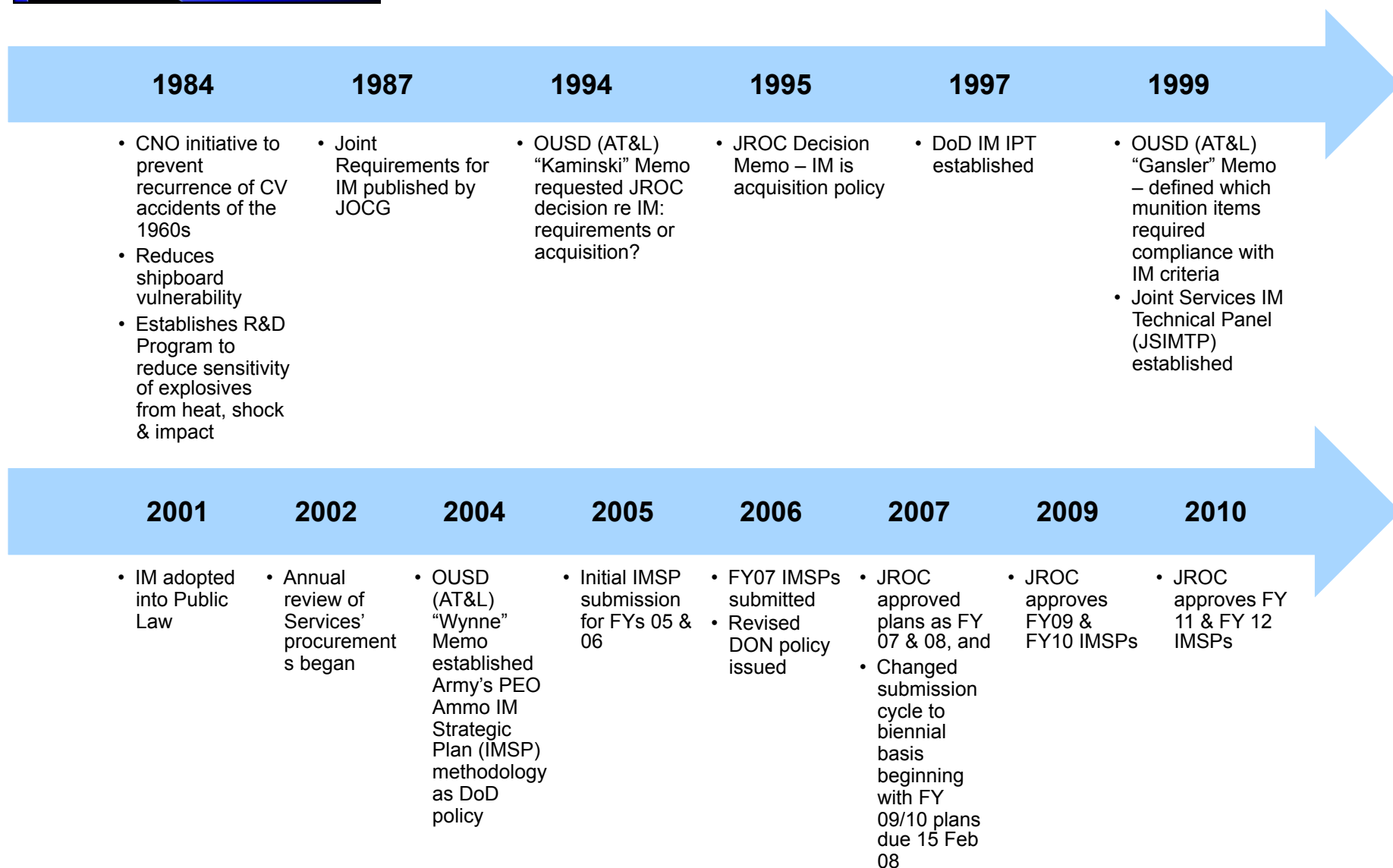
"The Naval Sea Systems Command is the Lead SYSCOM for Explosive Materials, Energetic Materials and Insensitive Munitions and is responsible for the overall coordination of the IM Program." - ***NAVSEAINST 8010.5B***



The Navy's IM policy applies to all conventional munitions – regardless of the source of design or manufacture – that are used, stored or transported aboard US Navy platforms or held at Naval activities ashore



# IM Background





# WESRB Authority

## **DODI 5000.2 Para E12.6** - Operation of the Defense Acquisition System

- PM shall eliminate hazards and manage risks
- ESOH Risk Acceptance Authority



## **SECNAVINST 5000.2E** - Implementation & Operation of the Defense Acquisition System & the Joint Capabilities Integration and Development System

- WESERB is Navy independent agent for assessing weapon safety



## **SECNAVINST 5100.10J** - Policy for Safety, Mishap Prevention, Occupational Health & Fire Protection Programs

- System safety will be applied to acquisition of all systems and facilities



## **OPNAVINST 8020.14/MCO P8020.11** - Explosive Safety Policy

- Explosives Safety Policy
- Tasks COMNAVSEASYSCOM to establish WESERB

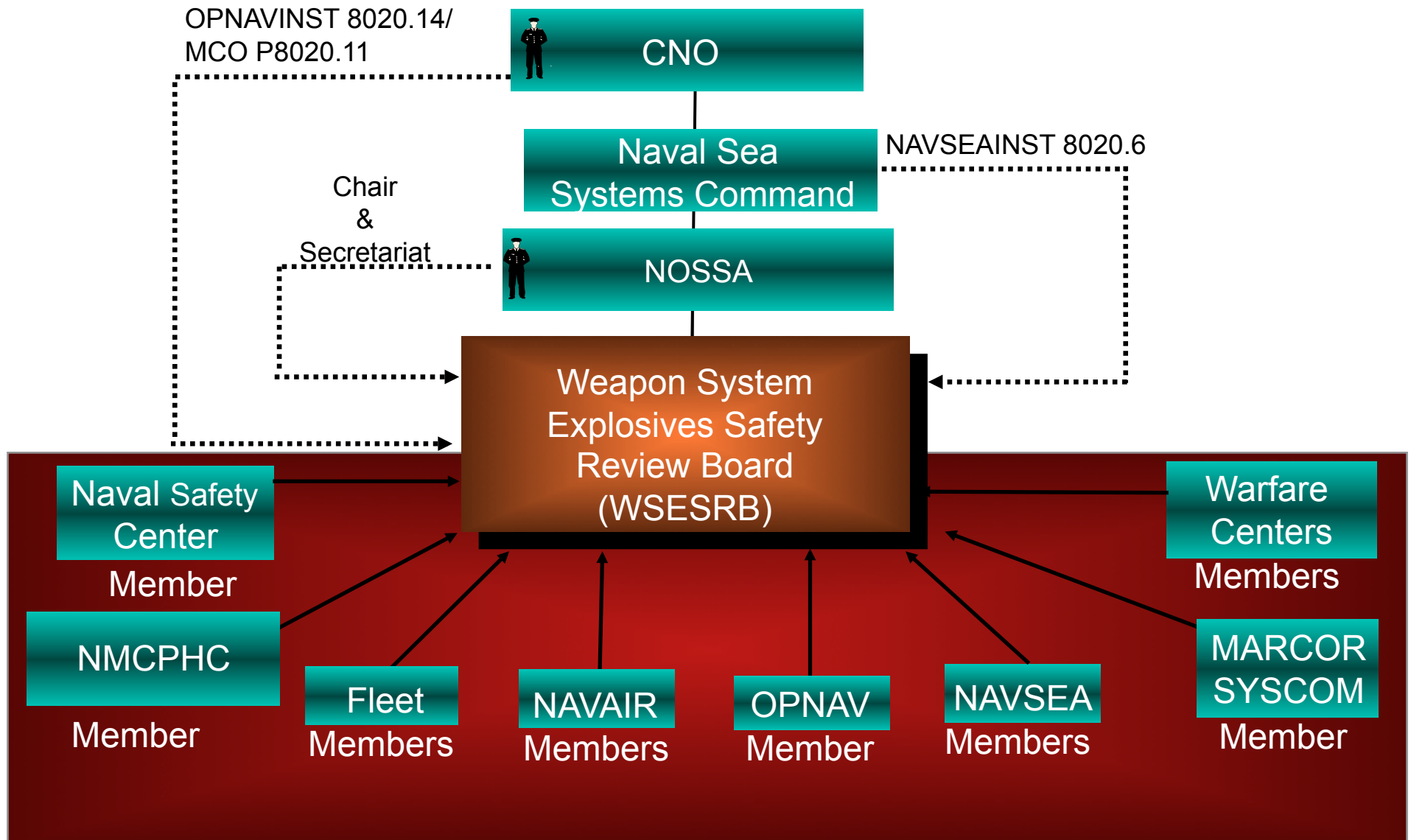


## **NAVSEAINST 8020.6E** - Weapons Systems Explosive Safety Review Board

- Defines WESERB process and procedures



# WSERSB Composition







# WSESRB Reviews

## Acquisition Events That Can Trigger WSESRB Reviews

